



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 4 : B65D 19/28, 19/38, E04C 3/06 E04C 3/07		A1	(11) International Publication Number: WO 90/03921 (43) International Publication Date: 19 April 1990 (19.04.90)
(21) International Application Number: PCT/AU89/00428 (22) International Filing Date: 29 September 1989 (29.09.89)		HU, IT (European patent), JP, KP, KR, LK, LU, LU (European patent), MC, MG, ML (OAPI patent), MR (OAPI patent), MW, NL, NL (European patent), NO, RO, SD, SE, SE (European patent), SN (OAPI patent), SU, TD (OAPI patent), TG (OAPI patent), US.	
(30) Priority data: PJ 0801 7 October 1988 (07.10.88) AU PJ 4454 30 May 1989 (30.05.89) AU PJ 4944 27 June 1989 (27.06.89) AU		Published With international search report.	
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(81) Designated States: AT, AT (European patent), AU, BB, BE (European patent), BF (OAPI patent), BG, BJ (OAPI patent), BR, CF (OAPI patent), CG (OAPI patent), CH, CH (European patent), CM (OAPI patent), DE, DE (European patent), DK, FI, FR (European patent), GA (OAPI patent), GB, GB (European patent),			
(54) Title: SUPPORT MEMBER			
(57) Abstract			
<p>A support member comprises an elongate channel (1) having a base (3) and side panels (2) extending upwardly from base (3). Each side panel has a laterally extending flange (5) at its upper edge, and a plurality of integrally formed ribs (6) extending from adjacent the base to adjacent the flange, the ribs may be widest at the base and taper towards the flange. The channel (1) may be V-shaped in cross-section. A top panel (8) may be attached to the side panels (2) by folding with or about the flange (5). In use as a pallet or decking member (14), of M- or W-shaped cross-section, may be attached to flanges (5) of the elongate channel (1). The structural support members resist twisting and can withstand higher pressures at thinner metal thicknesses than 'C' section purlins. Scaled up support members are suitable for use as construction beams, such as roof trusses or floor support joists.</p>			

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Title: SUPPORT MEMBER

Field of the Invention

The present invention relates to a support member, intended for use as a member or bearer for a pallet of the type commonly used in industry to transport and store loads. However, scaled up support members according to the invention are suitable for use as construction beams, such as roof trusses or floor support joists.

The invention will hereinafter be described with particular reference to support members for pallets but is not restricted to that use.

Background Art

In the past pallets have been made from wood. Wooden pallets, however, suffer from certain disadvantages such as being relatively heavy for their load-bearing capacity. Also they require special treatment if they are to be used for overseas transport or in "clean" environments. The strapping of goods onto

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timber pallets has also presented problems, as the tines or forks of lifting equipment frequently damage or even break the straps.

In an attempt to overcome some of these problems associated with wooden pallets it has been proposed to make pallets from steel or aluminium, or like materials. Several metal pallets have been proposed, but have been less than satisfactory since they have involved a relatively large number of components in order to provide a satisfactory load-bearing capacity and satisfactory resistance to torsional forces.

In a similar way, support beams used in the construction industry both of wood and metal types have been relatively heavy and correspondingly expensive.

It is an object of the present invention to provide a structural support member which could serve as a pallet member for a pallet, which overcomes or at least ameliorates one or more of the disadvantages of the prior art.

#### Disclosure of the Invention

According to one aspect the present invention consists in a support member comprising an elongate channel having a base and two spaced apart side panels, each side panel extending upwardly from the base and having a plurality of integrally formed ribs extending from, or from adjacent the base to or to adjacent the flange.

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Preferably the ribs formed in the channel are indented inwardly.

Preferably also the support member includes a top panel fixedly secured to the channel in planar contact with the flanges.

Brief Description of the drawings

Several embodiments of the invention will now be described by way of example only with reference to the accompanying drawings, wherein:-

Figure 1 is a perspective view of a structural support member according to the first embodiment of this invention.

Figure 2 is an end elevation of the embodiment in Figure 1.

Figure 3 is a perspective view of a support member according to a second embodiment.

Figure 4 is an end elevation of the embodiment of Figure 3.

Figure 5 is a perspective view of a support member according to a third embodiment of this invention.

Figure 6 is an end elevation of the embodiment in Figure 5.

Figure 7 is a perspective view of a support member according to a fourth embodiment of this invention.

Figure 8 is an end elevation of the embodiment in Figure 7.

Figure 9 is an exploded view of detail 9 of Figure 8.

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Figure 10 is a perspective view of a support member according to a fifth embodiment of this invention.

Figure 11 is an end elevation of the embodiment in Figure 10.

Figure 12 is a perspective view of a support member according to a sixth embodiment of this invention.

Figure 13 is an end elevation of the embodiment in Figure 12.

Figure 14 is an exploded part view end elevation of a flange and top assembly of a support member according to a seventh embodiment of this invention, as shown in detail 14 of figures 11 and 13.

Figure 15 is an exploded part view end elevation of a flange and top assembly of a support member according to an eighth embodiment of this invention.

Figure 16 is a perspective view of a decking member of a pallet for connection to a support member according to a ninth embodiment of this invention.

Figure 17 is a perspective view of first variation of a decking member of a pallet for connection to a support member according to the ninth embodiment of this invention.

Figure 18 is a perspective view of a second variation of a decking member of a pallet for connection to a support member according to a ninth embodiment of this invention.

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Figure 19 is a plan view of several arrangements of decking members on support members in the formation of pallets according to a ninth embodiment of this invention.

Figure 20 is a partial side elevation of a pallet according to a ninth embodiment of this invention.

Figure 21 is a partial side elevation of a pallet according to a ninth embodiment of this invention shown at right angles to the view in Figure 20.

#### Embodiments of the Invention

Turning now to describe the first embodiment of this invention as illustrated in Figure 1 and Figure 2, there is shown a support member indicated generally at 1. The support member 1 comprises an elongate channel 2 having a base 3 and two spaced apart side panels 4, the channel having a generally 'U' shaped cross-section. Throughout the specification the terms horizontal and lateral will correspond to the planar direction defined by the base 3 of a 'U' and similarly the term vertical will correspond with the direction of the upwardly extending arms of a 'U'. It will be appreciated that whilst all embodiments of this invention will be described in this orientation, the terms are used purely to define the relative positions of the elements comprising the invention, and that the invention is not limited to any particular orientation.

Each side panel 4, extends vertically upwards from

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base 3 terminating in an outwardly directed horizontal flange 5. Ribs 6 are pressed into the support member at regular intervals along its length in order to increase its stiffness.

Ribs 6 are pressed upwards into base 3, inwards into side panels 4, and downwards into the flanges 5 on their inner edge. The ribs 6 are wider at the bottom of the arms of the 'U' where they meet the base 3 than they are at the top where the arms meet the flanges 5, and ribs 6 taper uniformly as they rise up side panels 4.

Accordingly the ribs 6 may be conveniently pressed into the support member 1 by a suitable tool having two cooperating parts, the first which is pressed up the side panels 4 of the 'U' and into the base 3, and the second of which is pressed down onto the inner edges of the flanges 5. The parts of the two co-operate with each other in order to press the ribs into the support member and are shaped so as to be easily released after the pressing action has taken place.

In the regions where the flanges 5 meet the top of the side panels 4 of the 'U' the profile of the rib 6 changes from being inwardly pressed to being outwardly pressed. It should be appreciated that this embodiment of the support member may include a number of variations, for instance the flanges 5 may extend inwardly rather than outwardly and is also possible that the flanges could both extend in the same direction,

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with one extending inwardly and the other extending outwardly.

The flanges 5 may be created when the support member 1 is fabricated or they may be formed afterwards by bending the upper ends of the arms of the 'U'. Alternatively separate flanges may be welded to the upper ends of the arms of the 'U'.

The method of construction of this embodiment will vary to some extent according to size. Where the support members are for use as bearers in the construction of pallets, the channel, complete with flanges can be produced in one single press operation.

For structural beams of varying lengths, the sheet metal is first roll-formed into a 'U' section channel and the ribs are then pressed into the section twenty ribs at a time as a second stage operation.

Typically the dimensions of the construction beams are as follows:

<u>WIDTH</u>		<u>HEIGHT</u>
50	X	75
50	X	100
75	X	150
75	X	200
75	X	250
75	X	300
100	X	400

(where WIDTH = flange edge to flange edge and typical

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flange width = 14mm).

The ribs have a pitch of 30mm, and taper in width from 15mm at the base to 10mm at the top. The metal thickness is between 0.3 and 1.2mm.

In the following descriptions of further embodiments of this invention all common parts are identified by corresponding numerals.

Another embodiment of the invention is shown in Figure 3 and Figure 4. In order to increase the height and stiffness of the support member 1, it is possible to connect two of the channels 2 as shown. The connection is made between the bases 3 of each support member 1 to create an 'H' shaped cross-section support member shown generally at 7. The connection between the channels 2 can be made by means of welds, rivets, adhesive or any other suitable form of connection. However, in a preferred form the connection is made by means of cylindrical extensions from the base of one of the 'U' shaped support members which engage in corresponding holes in the base 3 of the other 'U' shaped support member 1 and are then hammered down to connect the members in the same way as if they were connected by rivets.

Referring now to Figures 5 and 6 there is shown another embodiment of the invention comprising a fabricated channel 2 to which is fixed a top panel 8. The channel comprises two vertical side panels 4, each

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having a series of inwardly indented ribs 6 and each having two outwardly directed flanges one at the base of the panel and one at the top of the panel. The run out 9 of the ribs 6 extends right up to the flange to give maximum strength and rigidity when connected to the base 3, and top 8 respectively. In this embodiment the base 3 and top 8 are connected to the side panels 4 by a single fold of the top panel 8 and base 3 about the flanges 5 of the side panels 4.

In fabricating the support member 1 the side panels 4 are made from flat sheets of metal, preferably steel or aluminium, by pressing or roll forming a series of vertical ribs 6 all along the length of each side panel 4. The ribs 6 extend from near the top to near the bottom of the side panel. Then, the top and bottom part of each side panel are bent around to form horizontally extending flanges 5. It is important that the vertical ribs extend right up to the point at which the flanges are bent and that the flange extends as a continuation of the run out curve 9 of each rib 6 to maximise the strength of the construction. In this and all fabricated embodiments of the channel, the ribs are parallel and about 15mm in width. The top panel 8 and base 3 are also made from flat sheets of metal. The two side panels 4 are then placed side by side with the flanges 5 extending outwardly and the top section and base 3 are then moved into place such that they extend beyond the flanges 5 of

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the side panels 4. The outer ends 10 of the top panel 8 and base 3 are then bent around the horizontally extending flanges 5 to sandwich them and create a rigid structure. If desired the folded end of the base 3 and top panel 8 may be crimped or spot welded onto the flanges 5 to ensure a rigid fix.

With reference to figures 7, 8 and 9 there is shown a fourth embodiment of the invention. Parts of the figures 7, 8 and 9 corresponding to parts of figures 5 and 6 are identified by corresponding numerals. The fourth embodiment differs from the third embodiment in two important respects, most clearly shown in Figure 9. One difference is that the top panel 8 and base 3 (instead of being bent around horizontal flanges 5 to give three thicknesses of metal as in Figure 5 and Figure 6) are folded together as shown in Figure 9 with flange 5 to give a join in which three thicknesses of the top panel 8 or base 3 are joined with two thicknesses of the horizontal flange 5.

If the horizontal extending flange of the embodiment of Figure 5 has a width of 'W' then the corresponding part of the embodiment of Figure 7 has a width of approximately  $2W$  and the top panel 8 and base 3 overhangs horizontal flange 5 to outer end 10 by a further width of almost 'W' prior to folding. The join of Figure 9 is then formed e.g. by roll forming.

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A second difference is that the top panel 8 and base 3 are provided with longitudinally extending ribs 11 and 12 along their length. In the illustrated embodiment the ribs 11 are of 'V' cross-section and indented. The two outer ribs adjacent the side panels 4 are closely adjacent the interior side of the vertical ribs 6 and as such assist in centering the top panel 8 and base 3 with respect to the side panels 4 during assembly wedging the side panels 4 with the flanges 5 against the outer ribs 12, as well as stiffening the top and base panels.

The longitudinally extending ribs 11 and 12 are formed in the base 3 and top panel 8 prior to assembly with side panels 4.

The structural support members described in this embodiment resist twisting and can withstand higher pressures at thinner metal thicknesses than for example 'C' section purloins.

For example a support member for use in a pallet may be made using 0.45mm or thinner high tensile galvanised steel (or zinc alum G 300) for the top panel 8 and base 3 and 0.55mm thickness or less for the side panels 4.

Referring now to figures 10 and 11 there is shown a fifth embodiment of this invention. The construction of the channel is almost identical to that discussed in the first embodiment of this invention referred to in figures 1 and 2. The major difference in the construction of the channel 2 is that the section is generally of a 'V'

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shaped construction having a very narrow integral base 3 from which the side panels 4 extended in an upwardly and outwardly direction. In this embodiment the ribs 6 are of constant width. As in figures 5 to 9 inclusive the run out 9 of the ribs extends up to the flange. In this embodiment the top panel 8 has two outer longitudinally extending ribs 12 of a substantially 'V' shaped section, the 'V' comprising two curved portions corresponding to the curve of the run out 9, located so that on assembly the two ribs are disposed in supporting engagement with the innermost surfaces of the channel ribs 6. The top panel 8 is connected to the channel 2 by the same method as described in discussion of the fourth embodiment with reference to Figure 9, excepting that the corresponding curves of the longitudinally extending ribs of the top panel 8 provide a more positive support with the ribs 6 of channel 2 (see Figure 14).

The sixth embodiment as illustrated in figures 12 and 13 is almost identical in the method of construction to the fifth embodiment discussed in reference to figures 10 and 11. The major difference is that the shape of the 'U' channel 2 includes a base portion 3 of width greater than discussed in the fifth embodiment but narrower than the width of top panel 8. This embodiment of the invention has an additional longitudinally extending rib 11 midway along its width. The method of attachment of

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the channel 'U' to the top panel 8 is as described in the fifth embodiment and shown in more detail in Figure 14.

Figure 15 shows an alternate method of attachment and folding of the top panel 8 with the channel 2, according to an eighth embodiment. As shown the embodiment includes a top panel 8 incorporating longitudinally extending ribs 12 of the same section as described in embodiments 5 and 6. However, it will be appreciated that this method of attachment can be applied to any of the embodiments discussed.

It is highly desirable that the ribs extend fully to the flanges. As illustrated in particular in Figure 6, and again in more detail in figures 9, 14 and 15, the indented ribs 6 terminate at each end in a curved run out portion 9. The outer surface of this portion extends tangentially as a continuation of the curve to form the flange 5. All subsequent folds of the flange with a top panel 8 or bottom panel 3 are precisely nested in a spiral formation against the corner of panel 4. This provides an exceptionally strong fold that will resist buckling.

In this embodiment the top panel 8 and flanges 5 are extended by an additional width 'W' which is folded against the side panels 4 thereby increasing the rigidity at the join.

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Referring finally to figures 16 to 21 there is shown a ninth embodiment of the invention in which the support members 1 are used as bearers for a pallet. The support members used as bearers are of the type described in the first embodiment and referred to in figures 1 and 2.

Referring now to Figure 16 decking member 14 has a generally 'M' shaped cross-section comprising vertical outer legs 15 joined at their tops to inwardly extending horizontal webs 16 which are joined at their inner ends to the tops of inclined webs 17 which define a central 'V' portion of the 'M'. The lower ends of each of outer legs 15 are bent or formed inwards to form horizontal flanges 18, the lower surfaces of flanges 18 being co-planar with the lower surface of the extremity, or in this case approximately 19, of the 'V' portion 20.

Referring now to Figure 17 the same reference numerals will be used where appropriate to refer to the corresponding elements of Figure 16. The cross-section of decking member 14' is identical to decking member 14 except that the central 'V' portion 20 has a flattened extremity with a horizontal portion 21 joining the lower ends of inclined portions 17. The lower surface of the flattened extremity of the 'V' portion, that is the underside of portion 21, being co-planar with the lower surfaces of flanges 18.

Figure 18 shows a further embodiment in which flanges 18 are turned outwards rather than inwards to

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form a decking member 14 which has outwardly extending flanges 18 the lower surfaces of which are co-planar with the lower surface of the apex 19 of the central 'V' portion 20. It should of course be appreciated that the decking member may be embodied in other forms as well, for instance the Figure 17 embodiment could be formed with the flanges extending outwardly rather than inwardly. It is also possible that the flanges could both extend in the same direction, with one extending inwardly and the other extending outwardly.

The flanges 18 may be created when the decking member is fabricated, or they may be formed afterwards by bending the lower ends of the legs of the M. Alternatively separate flanges may be welded to the lower ends of the legs of the M. It is not important which fabrication technique is adopted, the essential part of this aspect of the invention being the shape of the one section which results.

It should also be appreciated that although this aspect of the invention has been described with reference to particular examples where the legs of the 'M' have been vertical and the flanges and webs horizontal this need not be the case and the legs may be offset from the vertical and the flanges and webs offset from the horizontal. Nevertheless it is preferred that the webs

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16 have co-planar upper surfaces since this is essentially the surface upon which, in a pallet, the load rests.

It is essential that the lowermost points of the lower surfaces of the flanges 18 are co-planar, but it is not necessary that the lower surfaces of the flanges 18 are flat, and they could for instance be rippled or corrugated.

Turning now to Figure 20, various decking members 14 and 14' embodying the first aspect of the present invention are shown attached to a support member 1. The support member 1 defines a flat horizontal support surface 22. The decking members 14 and 14' lie against, and generally transverse support member 1 such that the lower surfaces of flanges 18 and the extremity of the 'V' portion 19 lie against support surface 22. The decking members 14 and 14' being attached to support member 1 by means of welds 23 at the contacting portions.

A pallet embodying the third aspect of the present invention may be constructed from two or more spaced apart support members 1 interconnected by two or more decking members 14 as indicated.

In an assembled pallet the upper surfaces of flanges 5 are attached to the lower surfaces of flanges 18 and apex 20 or flattened extremity 21 of the decking members. This is illustrated in figures 20 and 21.

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Five complete pallets 24 are shown in Figure 19. It can be seen that six welds 25 interconnect each decking member 14 with each support member 1 thus giving a very strong and rigid connection between them. The connection between the support members and the decking members may be a weld as indicated, although it would be appreciated that the connection may be equally well achieved by means of rivetting, screwing or similar mechanical processes.

When made from hi-ten galvanized steel or stainless steel a pallet of adequate strength may be fabricated from material having a thickness between 0.55 to 1.00mm. When made from aluminium a thickness of 1 to 2mm is required. Alternatively plastics material can be used to fabricate the decking and support members. The height of the return of the deck may vary between 20mm to 10mm depending on the application.

Also while the 'V' section is shown centrally located along the decking members it can be offset to one side or the other if desired. The section of the decking member need not be constant along its entire length but may of course vary along that length provided the required 'M' shaped section is available at the points of contact with the support members.

Additional stiffness can be obtained by the connection of additional decking members to the support member; these additional decking members may be connected

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to the top of the support members or to the bottom such that the lower surfaces of the flanges 18 and extremity of the 'V' portion 20 are connected to the underside of base 3. Figures 5 and 6 show one such additional decking member 24. This sandwiching of the support members by decking members increases the rigidity of the resulting pallet.

A pallet having additional height can be obtained by substituting the single 'U' shaped support member shown in Figure 1 for the double 'U' shaped support member shown in figures 3 and 4.

As will be apparent to those skilled in the art from the teaching hereof, the features of one embodiment can be combined with those of another to produce other embodiments within the scope of the invention.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. A support member comprising an elongate channel having a base and two spaced apart side panels, each side panel extending upwardly from the base and having a laterally extending flange at its upper edge remote from the base, and having a plurality of integrally formed ribs extending from, or from adjacent the base, to, or to adjacent the flange.
2. A support member as claimed in Claim 1 wherein the base of the channel is sufficiently narrow to define a channel of generally 'V' shaped cross-section.
3. A support member as claimed in Claim 1 in which the ribs are indented inwardly.
4. A support member as claimed in claim 3 wherein the flange extends tangentially to a run out portion of the ribs.
5. A support member as claimed in Claim 1 in which the ribs are indented inwardly from, or from adjacent the base, and downwardly and outwardly from, or from adjacent the flange.
6. A support member as claimed in Claim 1 or Claim 2 in which the channel is assembled from two side panels and one base panel.
7. A support member as claimed in any one of the preceding claims including a plurality of laterally extending ribs indented at the base.

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8. A support member as claimed in Claim 6 in which a base rib and two side panel ribs are formed as a continuous formation.
9. A support member as claimed in any one of the preceding claims in which the vertically extending ribs are widest at the base and taper towards the flanges.
10. A support member as claimed in any one of the preceding claims including a substantially planar top panel fixedly secured to the channel in planar contact with the flanges.
11. A support member according to Claim 9 where the top panel is secured by folding connection of the top panel and the flanges.
12. A support member as claimed in Claim 9 or Claim 10 wherein the top panel includes at least one 'V' cross-section longitudinally extending indentation.
13. A support member according to Claim 11 wherein the top panel includes a generally 'V' cross-section longitudinally extending indentation extending adjacent to and internally of each side wall.
14. A support member according to Claim 11 wherein the cross-section of each longitudinally extending indentation extending adjacent to and internal of each side wall corresponds with and is in mutual supportive alignment with the run out portion of the rib adjacent the flange.

15. A support member comprising two channel members each according to any one of the preceding claims having the base of one joined to the base of the other in overlying relationship.
16. A pallet comprising a support member as claimed in any one of the preceding claims in combination with one or more elongate decking members fixedly mounted thereto.
17. A pallet as claimed in Claim 15 wherein said elongate decking member is of a generally 'M' shaped section, the lower ends of each of the outer legs of the 'M' extending laterally to form a generally horizontal flange.
18. An elongate decking member having a generally 'M' shaped section, the lower ends of each leg of the 'M' extending laterally to form a flange, the central 'V' portion of the 'M' section extending in depth such that the lowermost point of the extremity of the 'V' portion is co-planar with the flanges.
19. An elongate decking member as claimed in Claim 16 in which the extremity of the 'V' portion of the 'M' section has a flattened portion in the plane of the flanges.
20. A method of fabricating a support member according to Claim 1 from sheet metal comprising the simultaneous pressing of an elongate channel of generally 'U' or 'V' shaped cross-section, the upper edge of each arm of the 'U' or 'V' extending laterally to form a flange and

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forming a plurality of correspondingly 'U' or 'V' shaped indented ribs in the channel.

21. A method of fabricating a support member according to Claim 1 comprising the steps of:

roll forming an elongate channel of generally 'U' or 'V' shaped cross-section;

subsequently pressing one or more laterally and vertically extending indented ribs spaced apart along the length of the channel.

22. A method of fabricating a support member according to Claim 5 comprising the steps of:

pressing the first part of a suitable tool up around the side panels;

simultaneously pressing a second cooperating part of the tool downwards onto the inner edges of the flanges, the first part of the tool forming inwardly indented ribs in the sides, and the second part of the tool forming downwardly and outwardly indented ribs across the fold of the flanges.

23. A method of fabricating a support member according to Claim 3 comprising the steps of:

pressing or roll forming a series of indentations along the length of at least two side panels;

folding the top and bottom ends of each side panel to form outwardly directed flanges;

arranging two side panels in parallel and spaced apart relationship with the flanges facing outwards;

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laying top and base panels against the outwardly directed flanges;

folding the ends of the top and base panels around the outwardly directed flanges to engage the side panels and form a structural support member having a generally box-shaped section.

24. A method of fabricating a support member according to Claim 20 or Claim 21 comprising the additional steps of:

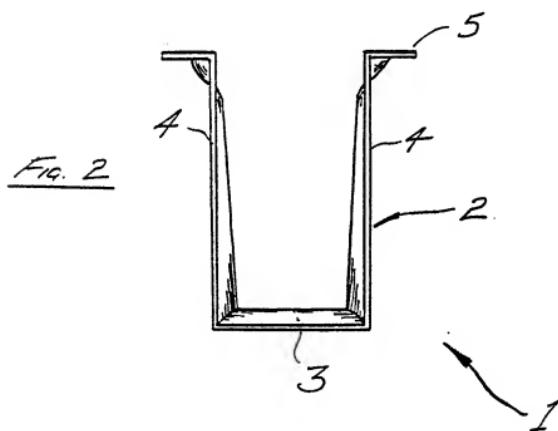
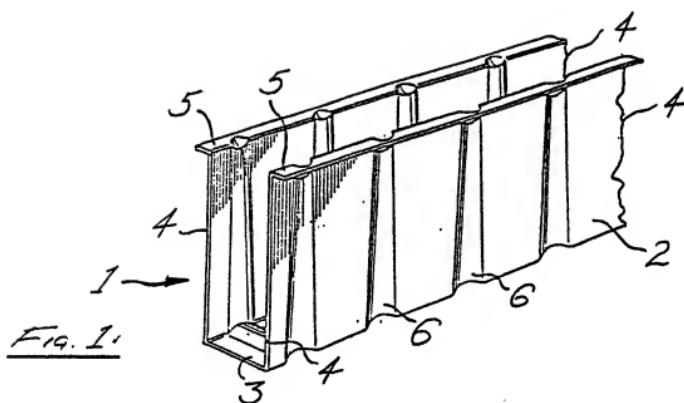
positioning a top panel against the outwardly directed flanges of the channel;

folding the ends of the top panel around the outwardly directed flanges to engage the channel and form a structural support member having a generally box-shaped section.

25. A support member substantially as herein described with reference to and as shown in the accompanying drawings.

26. A method of fabricating a support member substantially as herein described with reference to and as shown in the accompanying drawings.

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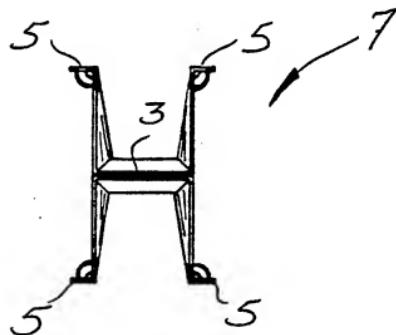
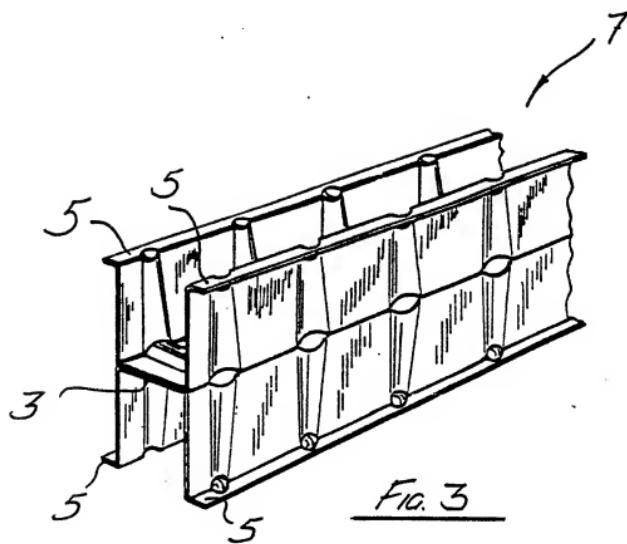
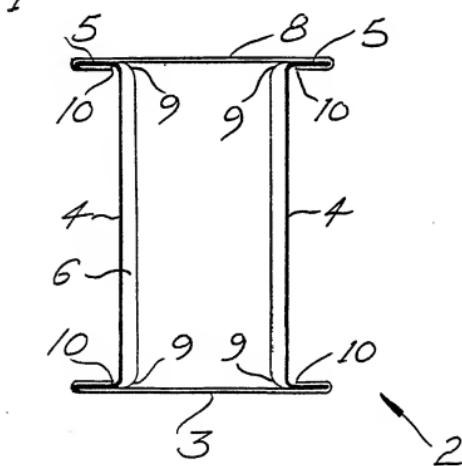
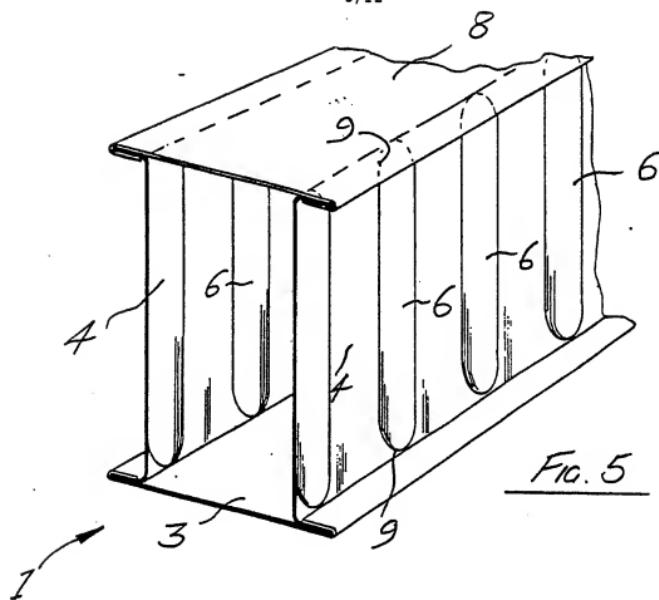


FIG. 4

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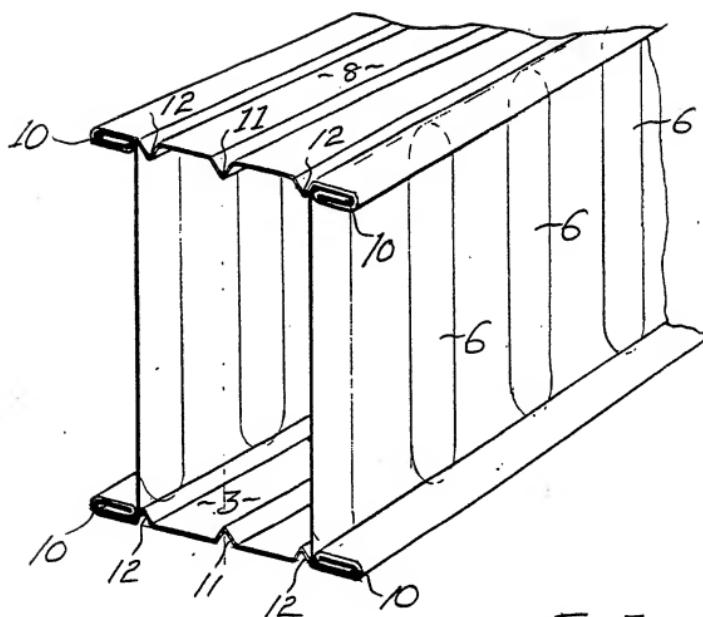


FIG. 7

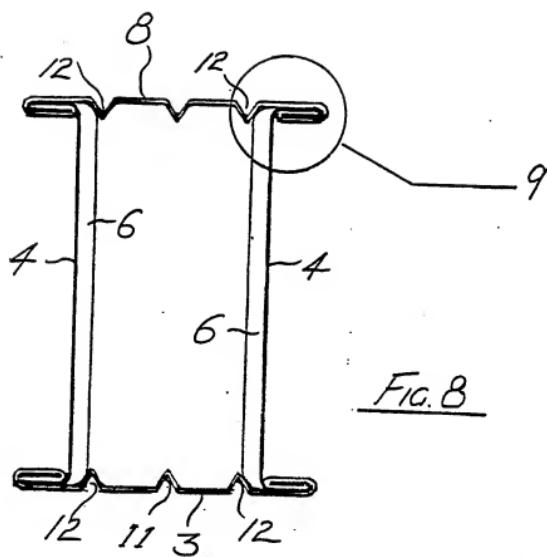


FIG. 8

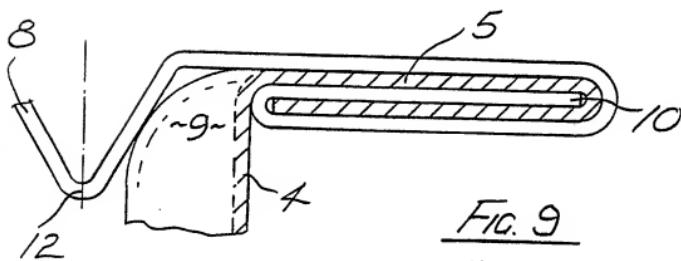


FIG. 9

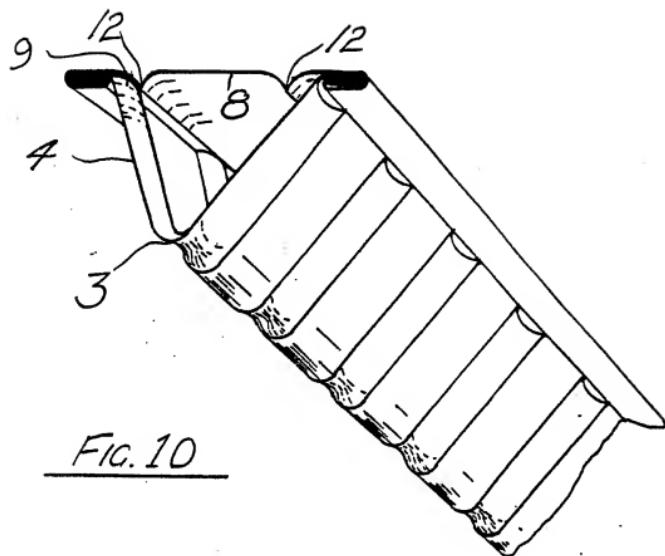


FIG. 10

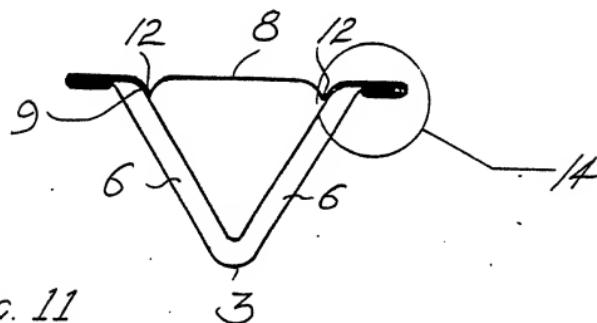
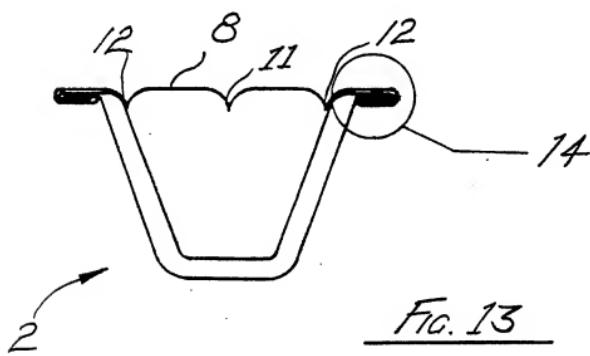
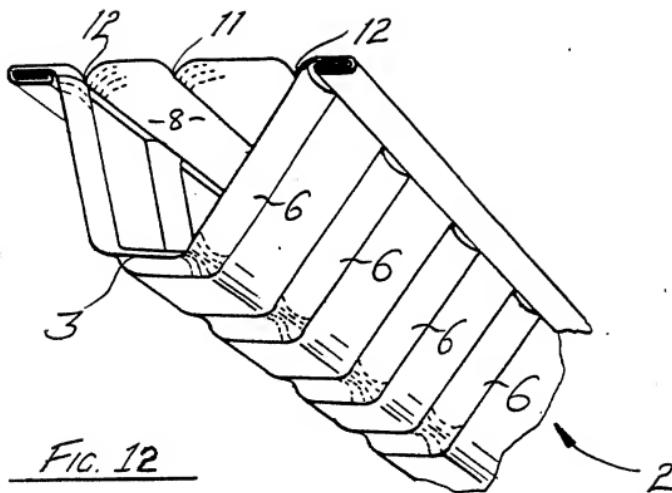


FIG. 11



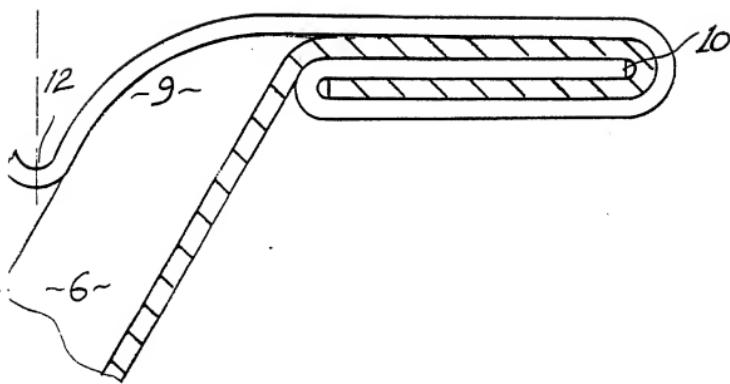


Fig. 14

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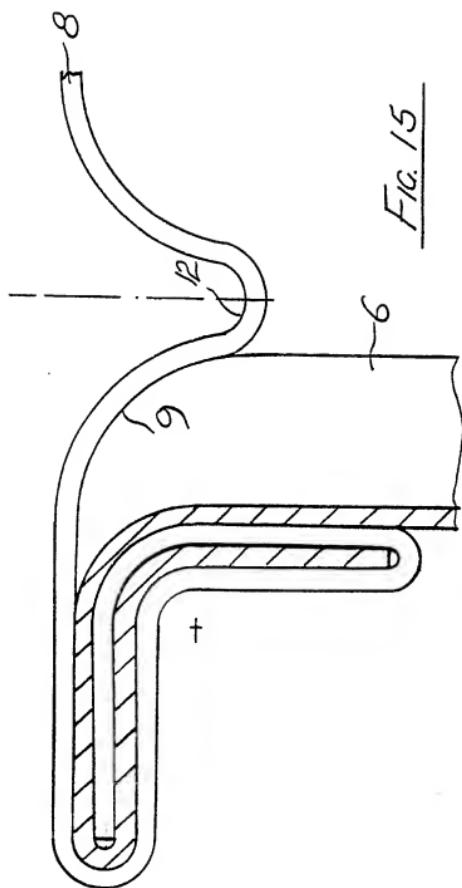
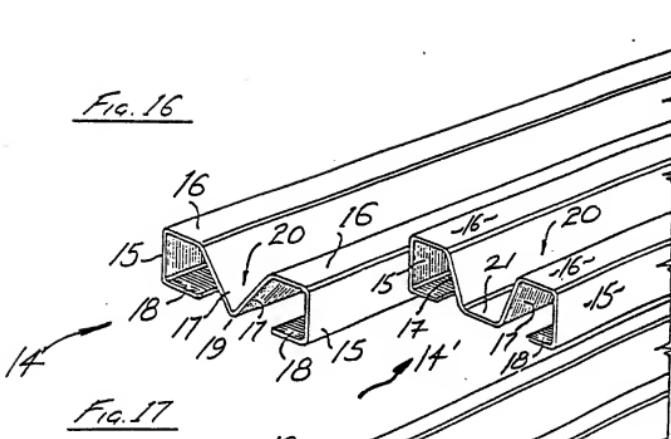
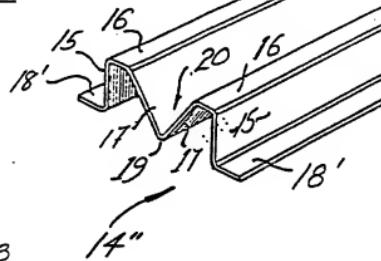


FIG. 16FIG. 17FIG. 18

14"

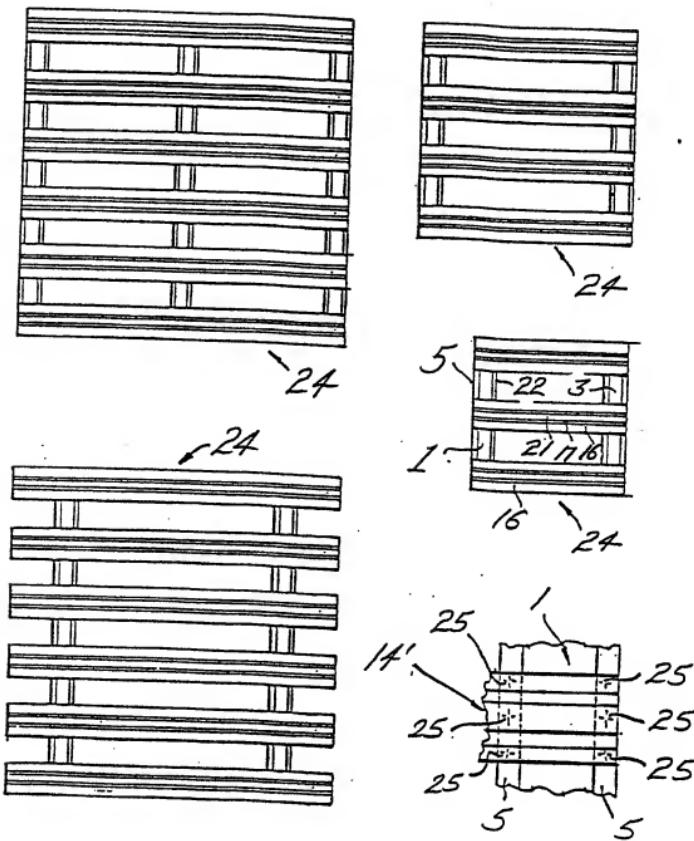


Fig. 19

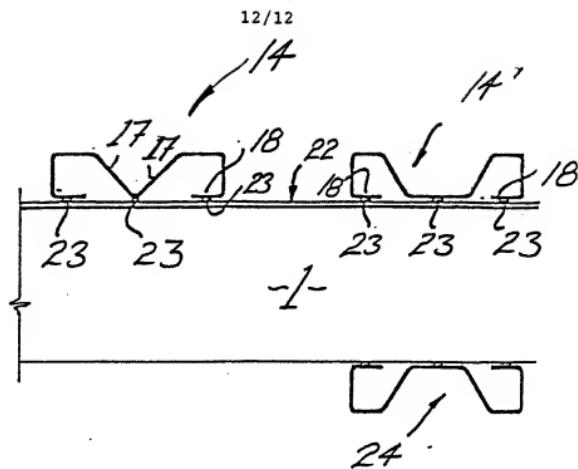


Fig. 20

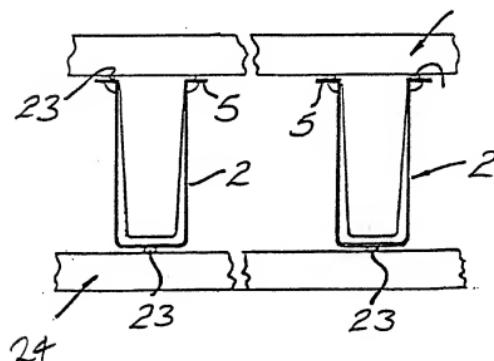


Fig. 21

## INTERNATIONAL SEARCH REPORT

International Application No. PCT/AU 89/00428

## I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) 6

According to International Patent Classification (IPC) or to both National Classification and IPC

Int. Cl.<sup>4</sup> B65D 19/28, 19/38; E04C 3/06, 3/07

## II. FIELDS SEARCHED

## Minimum Documentation Searched 7

Classification System	Classification Symbols
IPC	B65D 19/28, 19/38; E04C 3/06, 3/07

Documentation Searched other than Minimum Documentation  
to the Extent that such Documents are Included in the Fields Searched 8

AU : IPC as above

## III. DOCUMENTS CONSIDERED TO BE RELEVANT 9

Category*	Citation of Document, with indication, where appropriate, of the relevant passages 12	Relevant to Claim No 13
X	AU, B, 10693/47 (136109) (FORKTRUCKS PALLETS LTD) 17 April 1947 (17.04.47)	(1-4,6,8,15-19)
X	AU,B, 17868/76 (507599) (EXTRADOS COMPANY LTD) 23 March 1978 (23.03.78)	(17-19)
X	AU, A, 25067/77 (517136) (SIVACHENKO) 21 December 1978 (21.12.78)	(1-3,7,8,10,12)
X	AU,A, 46094/85 (DASH) 13 February 1986 (13.02.86)	(1-4,6,8,15-19)
X	AU,A, 49966/85 (566998) (HUNTER DOUGLAS INTERNATIONAL) 24 April 1986 (24.04.86)	(1,3,6,8,10)

(continued)

* Special categories of cited documents: 10	"Y"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step
"E" earlier document but published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
"L" document which may throw doubts on priority or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y"	document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means		
"P" document published prior to the international filing date but later than the priority date claimed		

## IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
11 December 1989 (11.12.89)	5 January 1990
International Searching Authority	Signature of Authorized Officer
Australian Patent Office	

## FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

X	AU,A, 67012/86 (HERRING FORD INDUSTRIES PTY LTD) 16 July 1987 (16.07.87)	(20,21)
X	US,A, 2125590 (E.J.W. RAGSDALE et al) 2 August 1938 (02.08.38)	(1-4,6-8)
X	US,A, 3971326 (F.M. SVIRKLYS) 27 July 1976 (27.07.76)	(17-19)
X	GB,A, 1068761 (W.H. WILLATTS) 17 May 1967 (17.05.67)	(17,18)
X	FR,A, 2500811 (GUILPAIN et al) 3 September 1982 (03.09.82)	(1,2,9,10,20,21)
X	DE,AL, 3339373 (THYSSEN INDUSTRIE AG) 9 May 1985 (09.05.85)	(17-19)
X	DE,CL, 3442355 (RICHIER SYSTEM GmbH & CO) 2 January 1986 (02.01.86)	(1,3,4,6-8,10, 20,21)

V.  OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE 1

This International search report has not been established in respect of certain claims under Article 17(2)(e) for the following reasons:

1. Claim numbers ..., because they relate to subject matter not required to be searched by this Authority, namely:

2. Claim numbers , because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claim numbers ...., because they are dependent claims and are not drafted in accordance with the second and third sentences of PCT Rule 6.4 (a);

VI.  OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING 2

This International Searching Authority found multiple inventions in this international application as follows:

The only feature common between claims 1 to 17 and claims 18 to 19 is that they define support members. This feature does not form a single general inventive concept.

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.
2.  As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:

3. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:

4.  As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.

## Remark on Protest

The additional search fees were accompanied by applicant's protest.  
 No protest accompanied the payment of additional search fees.

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON  
INTERNATIONAL APPLICATION NO. PCT/AU 89/00428

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Members					
AU	26067/77	CA	1098661	JP	53000620	US	4099359
		US	4186541	US	4211504	US	4220423
AU	46094/85	DK	1149/86	EP	187834	FI	861016
		NO	860951	WO	8600866		
AU	49966/85	AU	74792/87	EP	99240	EP	192295
		US	4526024	US	4713924	WO	8400392
FR	2500811	EP	59670				
DE	3339373	DK	5048/84	EP	143290		

END OF ANNEX